

REMARKS

In the Office Action, Claims 46-80 were pending and all were rejected. This present submission amends Claims 56, 79 and 80; and adds new Claims 81-105.

It is acknowledged that the protest of June 29, 2003 was deemed by the Examiner to be non-persuasive.

OFFICE ACTION REQUIREMENTS

In the Office Action, it was required to include a cross-reference to related applications. This has been done.

It is also noted that in Office Action a "supplemental reissue oath/declaration" is required. Such is being submitted along with this response and a copy is included as **Attachment 1** to this response.

REJECTION BASED UPON DEFECTIVE REISSUE DECLARATION

Claims 46-80 were rejected as being based upon a defective reissue declaration. This has been resolved herewith by submission of **Attachment 1**, the Supplemental Reissue Oath/Declaration.

REJECTION UNDER 35 U.S.C. § 112

A. Claim 52 was rejected under 35 U.S.C. § 112, first paragraph, on the basis of the term "semiconductor" not appearing within the original disclosure. (Office Action, Page 3, Item #4.)

Examiner's attention is respectfully directed to the specification throughout, which is not limited to any particular material, but instead teaches that the method of the invention is applicable to all materials, of which semiconductor is a species.

As further evidence, Applicant respectfully submits that those of low or ordinary skill in the art recognize that (a) the ability of materials to conduct current is directly proportional to the number of free (i.e., loosely held) electrons in the material; and (b) the range of resistivity (and its converse conductivity) ranges from that of metal to that of glass, with semiconductor material being in between.

The present invention provides examples of metals (which are conductors), glass (which is relatively an insulator) and material having conductivity or resistivity intermediate between the two materials; namely, organic material. Contemporary research from the late to mid-70's up through present day, as demonstrated in **Attachment 2** attached hereto, supports that organic semiconductor materials are known.

The Office Action states that the affidavit of Dr. Pronko is "by a person of very high skill and [sic] the art; not one of ordinary skill in the art" and, therefore, cannot overcome the alleged deficiency that the material be a semiconductor. It is respectfully submitted that the exhibits of **Attachment 2** demonstrate that a person of very high skill in the art and a person of ordinary skill in the art and, indeed, an educated layman would understand that semiconductor organic materials are known and encompass tissue, which is included in the specification as filed.

Given that the present specification teaches conductive, semiconductive and isolative materials, it is respectfully submitted that the term "semiconductor" is appropriately used in the claims and adequately supported in the specification as filed.

For the foregoing reason(s), withdrawal of this rejection of the above-referenced claims in this Section A is respectfully requested.

B. Claims 56, 57, 60, 61, 79, and 80 were rejected under 35 U.S.C. § 112, first paragraph, on the basis that it fails to comply with the enablement requirement. (Office Action, Page 4, Item #5).

It appears that the rejection of Claim 57 may have been a typographical error. The rejection of Claim 57 is with reference to a "Rayleigh range"; however, such term does not appear in Claim 57. Therefore, withdrawal of this rejection of Claim 57 is respectfully requested.

Claims 56 and 67 are also rejected on the basis that further inclusion of elements pertinent to inducing breakdown to a depth smaller than the Rayleigh range is needed. Without conceding that the rejection is appropriate, and *for the purpose of Claims 56 and 67 only*, Claims 56 and 67 have been amended to state that the method utilizes a "beam having maximum intensity at the center of the beam waist."

Claims 60 and 61, which depend directly or indirectly on Claim 56, were rejected on the same basis as Claim 56 and rejection of same is now obviated.

In independent Claims 79 and 80, the phrase "beneath the surface of" has been deleted. Therefore, the rejection under § 112 has been obviated.

For the foregoing reason(s), withdrawal of this rejection of the above-referenced claims in this Section B is respectfully requested.

REJECTION UNDER 35 U.S.C. § 102

A. Claims 46, 48, 49, 50, 51/46, 51/48, 51/49, 51/50, 52/46, 52/48, 52/49, 52/50, 55/46, 55/48, 55/49, 55/50, 57/46, 57/48, 57/49, 57/50, 58/46, 58/48, 58/49, 58/50, 61/56/46, 61/55/48, 61/56/49, 61/56/50, 62/55/46, 62/55/48, 62/55/49, 62/55/50, 63/46, 63/48, 63/49, 63/50, 69/48, 69/49, 69/50, 70/46, 70/48, 70/49, 70/50, 71/46, 71/48, 71/49, 71/50, 72/46, 72/48, 72/49, 72/50, 73/46, 73/48, 73/49, 73/50, and 78 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ihlemann et al. in the article "Nanosecond and Femtosecond Excimer Laser Ablation of Fused Silica." (Office Action, Page 5, Item #7.)

The basis of the rejection is that Ihlemann et al. essentially shows small pulse duration; and, *on this basis alone*, according to the rejection, Ihlemann is inferred to be using the method as defined in the rejected claims.

It is respectfully submitted that the present specification, consistent with the invention as defined in the claims, clearly shows that small pulse width is not enough to cause breakdown. Clearly, the present application demonstrates that small pulse width having insufficient energy does not cause essentially accurate breakdown, and no damage at all may occur. At small pulse widths, if the energy is too great, then breakdown will occur with significant collateral damage, and the breakdown is not essentially accurate. Thus, with insufficient energy or surplus energy, breakdown will not be essentially accurate. The essentially accurate nature of the breakdown is shown by the decreasing error bars as in Figures 8 and 9 and the specification at Column 8, Lines 6-9 and Column 11, Lines 50-61.

Therefore, an important teaching of the present invention, as captured by the claims, is that the relationship between log fluence breakdown threshold and log laser pulse width is a relationship that exists throughout the relatively long and relatively short pulse width regimes. The relationship in the relatively short pulse width regime is different than in the relatively long pulse width regime. However, throughout the range of pulse width, energy and pulse width continue to be related. The relationship between pulse width and energy is a feature of the present invention. Further, from the point of deviation, the curves may differ since the materials differ. (Column 10, Lines 36-40.) This is contrary to the basis of the rejection.

Ihleman et al., like all of the other art of record, does not recognize that causing accurate ablation without collateral damage in the short pulse regime must be conducted in accordance with a method that relates the pulse width to the fluence breakdown threshold.

Ihleman et al., and all of the art of record, fails to recognize the relationship between fluence breakdown threshold and pulse width, as in all of the claims of the present application.

For the foregoing reason(s), withdrawal of this rejection of the above-referenced claims in this Section A is respectfully requested.

B. Claims 46, 48, 49, 50, 51/46, 51/48, 51/49, 51/50, 52/46, 52/48, 52/49, 52/50, 55/46, 55/48, 55/49, 55/50, 57/46, 57/48, 57/49, 57/50, 58/46, 58/48, 58/49, 58/50, 61/56/46, 61/55/48, 61/56/49, 61/56/50, 62/55/46, 62/55/48, 62/55/49, 62/55/50, 63/46, 63/48, 63/49, 63/50, 69/48, 69/49, 69/50, 70/46, 70/48, 70/49, 70/50, 71/46, 71/48, 71/49, 71/50, 72/46, 72/48, 72/49, 72/50, 73/46, 73/48,

73/48, 73/49, 73/50, and 78 were rejected under 35 U.S.C. § 102(b) as being anticipated by Alexander (USPN 6,489,589 B1). (Office Action, Page 6, Item #1.)

Alexander is applied on the same basis as Ihlemann et al. The statement of the reason for rejection is the same as for Ihlemann et al. It is noted that Ihlemann is directed to fused silica and Alexander is directed to certain metals. Alexander suffers from the same deficiencies as Ihlemann.

Alexander, like all of the other art of record, does not recognize that causing ablation without collateral damage in the short pulse regime must be conducted in accordance with a method that relates the pulse width to the fluence breakdown threshold, as in all of the claims of the present application.

For the foregoing reason(s), withdrawal of this rejection of the above-referenced claims in this Section B is respectfully requested.

REJECTION UNDER 35 U.S.C. § 103

A. Claims 47, 51/47, 52/47, 55/47, 56, 59, 60, 61, 58/47, 62/55/47, 63/47, 65/47, 66/47, 69/47, 70/47, 71/47, 72/47, and 73/47 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ihlemann et al. in view of Lai (USPN 5,984,916). (Office Action, Page 8, Item #4.)

Lai does not supply the deficiencies of Ihlemann et al. Lai is said to show the creating of an interaction zone that is smaller than the wavelength. However, Lai does not supply the critical teaching to achieve ablation without collateral damage, utilizing a method that combines relatively small pulse width along with a corresponding energy

sufficient to cause damage of a desired area, but insufficient to cause thermal effects or collateral damage.

For the foregoing reason(s), withdrawal of this rejection of the above-referenced claims in this Section A is respectfully requested.

B. Claims 64/46, 64/48, 64/49 and 64/50 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ihlemann et al. in view of Mourou et al. (USPN 5,235,606). (Office Action, Page 8, Item #5.)

Mourou '606 teaches method and systems for generating a short optical pulse. There is not a suggestion of the pulse width/threshold relationship to achieve ablation without collateral damage, utilizing a method that combines relatively small pulse width along with a corresponding energy sufficient to cause damage of a desired area, but insufficient to cause thermal effects or collateral damage. Thus, Mourou '606 does not supply the deficiencies of Ihlemann.

For the foregoing reason(s), withdrawal of this rejection of the above-referenced claims in this Section B is respectfully requested.

C. Claim 64/47 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Ihlemann et al. in view of Lai as applied to Claim 47, and further in view of Mourou '606 (Office Action, Page 8, Item #6.)

Lai and Mourou '606, alone or in combination, do not supply the deficiencies of Ihlemann et al. for the reasons give above.

For the foregoing reason(s), withdrawal of this rejection of the above-referenced claims in this Section C is respectfully requested.

D. Claims 65/46, 65/48, 65/49, and 65/50 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ihlemann et al. in view of Stuke et al. (USPN 5,243,589). (Office Action, Page 9, Item #7.)

Claim 65 depends on Claims 46-50 and defines scanning a beam along a workpiece. Stuke et al. describes moving a sample relative to radiation. Stuke et al. does not supply the deficiencies of Ihlemann et al. Stuke does not describe achieving ablation, utilizing a method that combines relatively small pulse width along with a corresponding energy sufficient to cause essentially accurate damage of a desired area, but insufficient to cause thermal effects or collateral damage.

For the foregoing reason(s), withdrawal of this rejection of the above-referenced claims in this Section **D** is respectfully requested.

E. Claims 47, 51/47, 52/47, 55/47, 56, 57/47, 58/47, 59, 60, 61, 62/47, 63/47, 65/47, 66, 68/47, 69/47, 70/47, 71/47, 72/47, and 73/47 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Alexander in view of Lai. (Office Action, Page 9, Item #8.)

This rejection of Alexander in view of Lai is similar to the rejection of Ihlemann in view of Lai above. (Office Action, Page 8, Item #4.) Lai is suggested to show creating an interaction zone.

However, Lai does not supply the deficiencies of Alexander. Lai does not supply the critical teaching to achieve ablation without collateral damage, utilizing a method that combines relatively small pulse width along with a corresponding energy sufficient to cause essentially accurate damage of a desired area, but insufficient to cause thermal effects or collateral damage.

For the foregoing reason(s), withdrawal of this rejection of the above-referenced claims in this Section E is respectfully requested.

F. Claims 64/46, 64/48, 64/49, 64/50 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Alexander in view of Mourou '606. (Office Action, Page 9, Item #9.)

This rejection on the basis of Alexander in view of Mourou '606 is similar to the rejection based on Ihlemann et al. in view of Mourou '606 above. (Office Action, Page 8, Item #5.)

Mourou '606 teaches method and systems for generating a short optical pulse. There is not a suggestion of the pulse width/threshold relationship to achieve ablation without collateral damage, utilizing a method that combines relatively small pulse width along with a corresponding energy sufficient to cause essentially accurate damage of a desired area, but insufficient to cause thermal effects or collateral damage. Thus, Mourou '606 does not supply the deficiencies of Alexander.

For the foregoing reason(s), withdrawal of this rejection of the above-referenced claims in this Section F is respectfully requested.

G. Claims 64/47 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Alexander in view of Lai as applied to Claim 47, and further in view of Mourou '606 (Office Action, Page 10, Item #10.)

This rejection is similar to the rejection of Claim 64/47 on the basis of Ihlemann et al. in view of Lai as applied to Claim 47, and further in view of Mourou '606 above. (Office Action, Page 8, Item #6.)

Lai and Mourou '606, alone or in combination, do not supply the deficiencies of Alexander for the reasons give above.

For the foregoing reason(s), withdrawal of this rejection of the above-referenced claims in this Section G is respectfully requested.

H. Claims 53/52/46, 53/52/48, 53/53/49 [sic], 53/52/50, 54/54/52/46, 54/53/52/48, 54/53/52/49, 54/53/52/50, 79, and 80 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Alexander in view of Wojnarowski et al. (USPN 5,104,480). (Office Action, Page 10, Item #11.)

The basis of this rejection is that Wojnarowski et al. teaches laser machining gold and it would have been obvious to adapt Alexander in view of Wojnarowski to create an integrated circuit on a substrate.

Wojnarowski et al. does not supply the deficiencies of Alexander to support this rejection, since Wojnarowski specifically teaches to "burn off" layers together (see abstract, claims and objects of Wojnarowski). In Wojnarowski, the laser burns material off a substrate, thus clearly collateral damage and thermal effects occur.

For the foregoing reason(s), withdrawal of this rejection of the above-referenced claims in this Section H is respectfully requested.

I. Claims 53/52/47, 54/53/52/47 and 68/47 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Alexander in view of Lai as applied to Claim 47, and further in view of Wojnarowski et al. (Office Action, Page 10, Item #12.)

For the reasons given above, Lai and Wojnarowski et al., alone or in combination, do not supply the deficiencies of Alexander.

For the foregoing reason(s), withdrawal of this rejection of the above-referenced claims in this Section I is respectfully requested.

ALLOWABLE SUBJECT MATTER

It is acknowledged with appreciation that Claims 67 and 74-77 patentably define over the art of record but are rejected on the basis of the requirement for an updated reissue oath. On the basis of the submission of the present updated reissue oath, withdrawal of this rejection is respectfully requested.

NEWLY-PRESENTED CLAIMS 81-105

Newly-presented independent Claim 81 essentially replaces dependent Claim 67 and Claim 46, from which it directly depends. Claims 82-85 depend directly on new Claim 81, and contain the limitations corresponding to Claims 74-77.

Newly-presented independent Claim 86 contains all the limitations of allowable Claim 67, including the limitations of independent Claim 47 on which it depends. Claims 87-90 depend directly on new Claim 86, and contain the limitations corresponding to Claims 74-77.

Newly-presented independent Claim 91 contains all the limitations of allowable Claim 67, including the limitations of independent Claim 48 on which it depends. Claims 92-95 depend directly on new Claim 91, and contain the limitations corresponding to Claims 74-77.

Newly-presented independent Claim 96 contains all the limitations of allowable Claim 67, including the limitations of independent Claim 49 on which it depends. Claims

97-100 depend directly on new Claim 96, and contain the limitations corresponding to Claims 74-77.

Newly-presented independent Claim 101 contains all the limitations of allowable Claim 67, including the limitations of independent Claim 50 on which it depends. Claims 102-105 depend directly on new Claim 101, and contain the limitations corresponding to Claims 74-77.

To further assist in Examiner in reviewing allowable subject matter, the following Table of Added Claims includes their relationship to allowable Claims 67 and 74-77 as presented herewith:

Table of Added Claims

Claim	Type	Corresponds to Allowable Claims
81	Independent	67/46
82-85	Dependent on 81	(74-77)/67
86	Independent	67/47
87-90	Dependent on 86	(74-77)/67
91	Independent	67/48
92-95	Dependent on 91	(74-77)/67
96	Independent	67/49
97-100	Dependent on 96	(74-77)/67
101	Independent	67/50
102-105	Dependent on 101	(74-77)/67

NON-PERSUASIVE PROTEST OF JUNE 29, 2003


It is acknowledged in the Office Action that the PROTEST of June 29, 2003 "in general is not persuasive." Only one matter pertaining to enhanced clarity is addressed in the Office Action, under 35 U.S.C. § 112.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: 30 September 04

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Attachments:

1. copy of Supplemental Declaration for Reissue Patent Application to Correct "Errors" Statement (x9)
2. contemporary research re: organic semiconductor materials

LDES/fi-s

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